In the outstanding Official Action, Claims 1 4-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over JP11285184 to Yoshifumi in view of U.S. Patent 5,551,662 to Tanimoto et al, and Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshifumi in view of Tanimoto et al. and further in view of EP 0223612 to Denk.

First, Applicants wish to thank Examiner Addison and Primary Examiner Tamai for the September 16, 2002 personal interview at which time the outstanding issues in this case were discussed. During the interview, arguments substantially as indicated in this response were discussed. While no agreement was reached, the Examiner indicated that the presented arguments would be fully considered upon filing of a formal response.

In addition, Applicants note that the title has been amended to reflect the title as changed by the International Searching Authority.

Turning now to the merits, Applicants' invention is directed to a permanent magnet motor and a method of manufacturing such a motor. Conventional permanent magnet motors have been problematic in that they have been unable to achieve an efficient motor having both reduced cogging torque and reduced vibration noise in a single motor design. Applicants' invention is directed to overcoming this problem.

Specifically, Applicants' Claim 1, recites a permanent-magnet motor having a stator, and a rotor facing to inside of the stator across a gap part, and having a rotor core and a permanent magnet provided to the rotor core. The permanent magnet is made so as to have both of a convex part to an inner diameter side and a convex part to an outer diameter side, a focus of magnetic orientation of each magnetic pole of the permanent magnet is located outside of the rotor. Also recited is that the rotor is formed by a rotor core assembly made by multilayering multiple pieces of core laminations, each having plural containing holes for

inserting the permanent magnets and the permanent magnets are inserted into the containing holes for inserting the permanent magnets, and a thickness of the rotor core, which separates the permanent magnet and the gap, is made within ±30% of a thickness of the rotor core lamination.

As described in Applicants' specification, a permanent magnet having both a convex part to an inner diameter side and a convex part to an outer diameter side, as well as a thickness of the rotor core that separates the permanent magnet and the gap being made within ± 30% of the thickness of the rotor core lamination provides the unexpected result of a highly efficient motor having reduced cogging torque and reduced vibration in a single motor design.[1] The reference to Yoshifumi discloses a motor structure that apparently includes both the convex inner and outer part of the permanent magnet. However, as discussed in the September 16th interview, the Yoshifumi reference does not disclose a thickness of the rotor core that separates the permanent magnet and the gap being made within ± 30% of the thickness of the rotor core lamination. In this regard, it is emphasized that the claimed range is with respect to the outer radial portion of the core and not the air gap itself. Moreover, as the Tanimoto et al reference discloses a permanent magnet having only a convex part to the inner diameter side of the motor, this reference also does not disclose the limitation of ± 30% of a thickness of the rotor core lamination. Finally, Denk does not teach, nor is it cited to teach, the above-noted limitation.

In response to the position taken by the Examiners in the September 16th interview that the claimed range of thickness of the rotor core that separates the permanent magnet and the gap is an optimization of workable ranges, Applicants note that it is settled law that a

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[1]See Applicants' specification at page 8, lines 6-13; page 8, line 25 - page 9, line 5; page 10, lines 1-3.

particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)[2] It is Applicants' position that the Official Action does not produce any evidence or technical argument that the parameter of thickness of the rotor core that separates the permanent magnet and the gap is effective to produce the result of a highly efficient motor having reduced cogging torque and reduced vibration. Indeed, the cited references do not discuss any range of thickness or any importance to the thickness of the rotor core at a position between the convex part to the outer diameter and the air gap. That is, the claimed thickness has not been recognized as a result-effective variable and Applicants cannot be said to have optimized a range. For these reasons, Claim 1 patentably defines over these prior art references.

Applicants also note that Claim 9 has been amended to include the method step of forming a rotor core assembly such that a thickness of the rotor core that separates the permanent magnet and the gap part is made within ±30% of the thickness of the multiple rotor core laminations. Thus, Claim 9 patentably defines over the cited references for the reasons stated above with respect to Claim 1. Finally, as Claims 3-8 depend from Claim 1, these claims also patentably define over the cited references.

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[2] See MPEP ' 2144.05 II B.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal Allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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Serial No. 09/869,322
Filed on: 10-30-02

IN THE TITLE

Please delete the original title and replace it with the following title:

--PERMANENT MAGNET TYPE MOTOR AND METHOD OF PRODUCING PERMANENT MAGNET TYPE MOTOR--.